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IMMUNITY TO BR. ABORTUS INFECTION

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In field experiments where both vaccinated and control animals were kept the inoculation of non-pregnant cattle with virulent live vaccine has not proved a satisfactory method of controlling contagious abortion and because of this virulent live vaccine has suffered discredit. This method of vaccination has, however, given very encouraging results where small numbers of vaccinated and control animals have been exposed to artificial infection of greater severity than that which would be met with in infected herds in the field. There appears to be only one satisfactory explanation for this apparent anomaly, although experimental proof is lacking, namely, that the vaccinated animals possess a very high resistance to a further infection or reinfection, but that a number of animals are infected by vaccination and abort because of the vaccination infection. The percentage that become infected and abort may vary with the age and condition of the animals when vaccinated, the interval elapsing between vaccination and the beginning of pregnancy, and possibly with the inherent resistance of individual animals to infection.

If this explanation were accepted, it would be possible to reconcile the apparent discrepancy between small-scale immunisation experiments in which the animals were exposed to an artificial infection and field vaccination trials.

As an illustration, the results of a small scale artificial infection experiment by Birch and Creech (1924) and certain of the results of a field experiment by Smith and Little (1923) may be compared. The latter experiment is selected because the bacteriological examinations on the animals concerned were exceptionally thorough for a field experiment. Birch and Creech exposed eleven vaccinated and eight control heifers to a heavy infection ; 2, or 18 per cent., of the vaccinated animals had infected uteri, one aborted and the other calved prematurely ; 7, or 87 per cent., of the control animals aborted or calved prematurely. In Smith and Little's experiment heifers, during their first pregnancy, were exposed to a natural infection from animals in an infected herd. Out of 48 heifers vaccinated before pregnancy 14, or 29 per cent., aborted or had infected placentae and 40, or 31·4 per cent., of the control animals were similarly diseased. In this experiment, the exposure to infection was probably more severe than generally occurs in infected herds because 31·4 per cent. of abortions or infected placentae must be regarded as a high incidence of disease. Nevertheless, it is difficult to avoid the conclusion that the exposure to infection in Birch and Creech's experiment was the more severe and the method of infection used by these workers very strongly suggests that this was the case. It is, therefore, quite unlikely that the 29 per cent. of abortions and infected placentae in the vaccinated animals in Smith and Little's experiment were caused by a natural exposure that infected only 31·4 per cent. of the controls, if the same method of vaccination protected 87 per cent. of animals from a much more severe artificial exposure.

If, on the other hand, the vaccinated animals that were found infected in both experiments were actually infected because of vaccination but were, along with the remaining vaccinated animals, immune to re-infection the results of the two experiments are perfectly reconcilable.

This latter view has not been given due prominence and a failure to recognise it has led to too general a condemnation of live virulent vaccine solely on the ground that it does not protect animals against a natural exposure to infection.

Thus, H. L. Gilman, who is well-known for his work on contagious abortion of cattle, in reviewing the book " Brucellosis in Man and Animals," by I. F. Huddleson *et al.*, in a recent number of the *Cornell Veterinarian* says, " It is stated that vaccine does not protect about 20 per cent. of the animals against infection. Has it been shown that the other 80 per cent. will be protected against virulent natural infection ? " This can only be interpreted as meaning that the reviewer doubts whether vaccination confers any protection against natural infection and it reflects the general pessimism regarding vaccinal immunity to *Br. abortus* infection.

Smith and Little (1923) were fully aware that vaccination might infect the cattle, but in interpreting their results, they failed to give adequate consideration to this possibility and in discussing the final results of their experiment, in which a number of the animals were followed to the completion of a second pregnancy, they say, " Highly susceptible heifers probably do not get sufficient protection since they tend to abort twice. The vaccination also tends to bring to the surface early those heifers which may become chronic aborters and which are not benefited by treatment." It is difficult to know exactly what is meant by these two sentences and there is nothing in the text to clarify them, but they might have read and there is no evidence to show why they should not have read, thus, " Highly susceptible heifers probably become infected by vaccination and abort twice. Vaccination, therefore, quickly reveals those animals that are most seriously injured by vaccination."

To prove that cattle inoculated with a virulent culture of *Br. abortus* are highly resistant to reinfection and that those which abort do so because of a vaccination infection, would be expensive and, as far as heifers of breeding age or older animals are concerned, could not be justified on the grounds that it would give further information regarding the practicability of using this type of vaccine in the field because it is known that some animals inoculated with virulent vaccine before pregnancy do become infected, and this of itself constitutes an objection to the use of virulent vaccine. But although experiments on cattle of breeding age may not be justified, experiments on laboratory animals would be of interest and should shed some further light on the question of immunity in cattle. It has already been pointed out by McEwen and Priestley (1938) that the immunity of guinea-pigs inoculated with strains of reduced virulence is related to the relative virulence of the vaccine strain, strains of low virulence conferring a better protection than a non-virulent strain. It has also been shown that the degree of immunity of cattle and guinea-pigs vaccinated with the same non-virulent strain is roughly comparable in degree (McEwen, 1939). Immunisation studies on guinea-pigs may, therefore, indicate the immunological response that may be expected from cattle.

EXPERIMENTAL

Advantage has been taken of the fact (McEwen, 1940) that strains of *Br. abortus* preserved *in vacuo* over P_2O_5 remain viable for long periods without loss of virulence, CO_2 sensitivity or other characteristics. Two preserved strains of *Br. abortus* both fully virulent have been used, the one—544—is CO_2 sensitive, the other—161—is aerobic. Strain 544 has been used for all primary infections, strain 161 for all secondary infections. The guinea-pig has been the experimental animal and evidence of infection has been assessed on the result of cultural examinations made on the spleens of animals killed (except in the case of one group of guinea-pigs) four weeks after exposure to reinfection. Strain 161 grows as luxuriantly in atmospheric air as in an atmosphere containing 10 per cent. CO_2, and advantage has been taken of this in determining whether strain 161 had infected the experimental animals. In all cases, spleen cultures were prepared in duplicate and one set was cultivated in atmospheric air and the other in the presence of 10 per cent. CO_2. When growth was obtained on the culture medium incubated aerobically it showed that the spleen was infected with strain 161. The absence of growth on culture medium cultivated aerobically and the presence of growth on the duplicate culture incubated in 10 per cent. CO_2 showed that the spleen was infected with strain 544 but not with strain 161.

In order to have a comparative estimate of the immunity or resistance to reinfection of animals infected with the virulent strain 544, their resistance was compared with that of animals inoculated with stain 45 (20) which is of low virulence but which has been shown to induce a moderate resistance to infection in guinea-pigs vaccinated with it (McEwen and Priestley, 1938).

The results of the first experiment are shown in Table I.

Table I.

		Guinea-pigs first inoculated with CO_2 strain 544.			Guinea-pigs first inoculated with aerobic rough strain of low virulence, 45 (20).			Controls.		
2nd inoculation. Dilution of aerobic strain 161.	Interval in weeks between 1st and 2nd inoculations.	No. of guinea-pigs examined.	Aerobic cults. No. of spleens giving growth.	CO_2 cults. No. of spleens giving growth.	No. of guinea-pigs examined.	Aerobic cults. No. of spleens giving growth.	CO_2 cults. No. of spleens giving growth.	No. of guinea-pigs examined.	Aerobic cults giving growth.	CO_2 cults giving growth.
				Intramuscular Inoculation of 1 c.c.						
10^4	4	11	0	11	9	*7	6	9	9	9
„	8	10	0	10	7	*7	7	9	9	9
„	12	8	0	8	8	*5	4	10	10	10
10^7	4	11	0	11	10	*3	3	9	9	9
„	8	9	0	9	9	†3	3	9	8	8
„	12	6	0	6	9	‡3	2	10	10	10
10^8	4	10	0	9	9	0	0	9	6	6
„	8	8	0	8	3	§1	1	9	6	6
„	12	9	0	9	9	§1	0	10	4	4

* From all the infected guinea-pigs colonies of a smooth strain of *Br. abortus* were recovered, indicating that the animals had been infected by strain 161.

† From two of the three guinea-pigs colonies of a smooth strain of *Br. abortus* were isolated. From the third guinea-pig only rough colonies were recovered. This animal's serum showed no agglutinins and it was probably infected with strain 45 (20) only.

‡ Colonies were not picked but none of the guinea-pigs' serum showed agglutinins, indicating that the animals were infected with the rough strain 45 (20) only.

§ From these guinea-pigs only colonies of a rough strain were recovered and the animals' sera showed no agglutinins for *Br. abortus*, indicating that the animals were infected with strain 45 (20) only.

Table I shows that animals vaccinated with strain 45 (20) are definitely more resistant to infection than the controls but it also shows in a striking manner the much greater resistance of the guinea-pigs infected with the virulent strain 544 to what was in all cases a reinfection. These animals, without exception, withstood what were at least 1,000 infective doses of a virulent culture of *Br. abortus*.

A further experiment was started with a view to ascertaining when this resistance to reinfection developed and, if possible, to find whether it persisted after the primary infection had disappeared from the tissues. The latter point was not satisfactorily determined because a pneumococcal infection occurred in the guinea-pig stock and brought the experiment prematurely to an end. The results of experiment two as far as they went are, however, given in Table II.

Table II

		Guinea-pigs first inoculated with CO_2 sensitive strain 544.			Controls.		
2nd inoculation. Dilution of aerobic strain.	Interval in weeks between 1st and 2nd inoculations.	No. of guinea-pigs examined.	Aerobic cults. No. of spleens giving growth.	CO_2 cults. No. of spleens giving growth.	No. of guinea-pigs examined.	Aerobic cults. No. of spleens giving growth.	CO_2 cults. No. of spleens giving growth.
			Intramuscular Inoculation of 1 c.c.				
10^4	1	6	0	6	6	6	6
,,	2	6	2	6	6	6	6
,,	3	6	0	6	6	6	6
,,	12	6	0	6	6	6	6
10^3	17	7	0	7	4	4	4
10^7	—	—	—	—	5	5	5
10^3	24	5	0	2	5	5	5
Undiluted	24	4	0	3	5	5	5
			Instilled on to Surface of Eye, 1 drop				
Undiluted	17	8	5	4	5	5	5

The second experiment shows that, within one week of infection, the animals were highly resistant to reinfection. This resistance appeared to have diminished somewhat two weeks after the first infection but to have been re-established three weeks after infection. The numbers of animals used were, however, too small to provide any conclusive evidence on degrees of immunity at these times.

The resistance of the animals 17 weeks after infection was put to a more severe test and the infected guinea-pigs withstood the intramuscular inoculation of 10,000 infective doses. Furthermore, a number of the infected animals all withstood a very heavy reinfection by the eye route. At this time a test showed that strain 161 had not lost anything in virulence.

Twenty-four weeks after primary infection with strain 544 the guinea-pigs were again found to be very highly resistant to reinfection. The animals showed no evidence of infection with strain 161 following the inoculation of even 10,000,000 infective doses of that strain.

The guinea-pigs exposed to reinfection 17 weeks after primary infection with strain 544 were killed and examined 18 days after the animals had been inoculated with strain 161. Four out of 15 animals had sterile spleens and the spleens of seven others were but lightly infected with strain 544. Four of the nine guinea-pigs exposed to re-infection 24 weeks after primary infection had sterile spleens and each of the remainder showed only a light infection with strain 544. These results suggest that the original infection may have gone from the bodies of some of the animals by the time they were inoculated with strain 161. The animals, however, remained very highly resistant to a further infection. This resistance of the non-infected guinea-pigs is probably in parallel with what may be the immune state of cattle that have recovered from a vaccination infection and resist a severe artificial exposure to infection.

The results shown in Tables I and II confirm what has already been stated, namely, that immunity to *Br. abortus* infection increases with the increase in the virulence of the living vaccine used and that the problem of immunising cattle with live cultures of *Br. abortus* is primarily to find the most virulent vaccine that can be inoculated into the animals without infecting them. The susceptibility of cattle varies according to age, the development of the udder and whether the animals were pregnant or non-pregnant. It may, therefore, be expected that for animals of different degrees of susceptibility different vaccines of safe and appropriate virulence should be available. At least three vaccines should be considered, the least virulent for pregnant cattle, the most virulent for young animals, the so-called calfhood vaccination, and a vaccine of intermediate but low virulence for non-pregnant heifers and other non-pregnant breeding animals. Although the experiments just described strengthen the contention that the inoculation of cattle with a virulent vaccine renders them very highly resistant to a further infection, its acceptance in no way diminishes the objection to using a vaccine that causes a uterine or an udder infection in some animals.

Summary

It is contended that vaccination of cattle with living virulent vaccine calls forth a high resistance to reinfection, and that those vaccinated animals that abort do so because of a vaccination infection and not on account of a subsequent exposure to infection.

It is shown that guinea-pigs infected with a virulent strain of *Br. abortus* possess a remarkably high resistance to reinfection and this supports the hypothesis that the same is true of cattle. Animals that have recovered from infection may still enjoy a high degree of immunity.

It is shown that the degree of vaccinal immunity to *Br. abortus* infection is linked to the virulence of the vaccine; the more virulent the vaccine the greater the immunity.

It is suggested that for the vaccination of cattle, the immediate problem is to find vaccines of suitable graded virulence for the safe immunisation of animals of different degrees of susceptibility, susceptibility being governed by age, the condition of the mammary gland at the time of vaccination, the time interval between vaccination and the beginning of pregnancy and pregnancy.

Pessimism regarding the future of vaccinal immunity is not justified.

[These experiments were financed by a grant approved by the Agricultural Research Council.]

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REVIEW

[DISEASES OF POULTRY IN NEW SOUTH WALES. T. G. Hungerford. New South Wales, Department of Agriculture. (1939.) 10s. 6d.]

This book is an account of diseases of poultry found in Australia and is written in such a style that it can be used profitably by poultry keepers. Many of the disease conditions also apply to this country and much useful information can be obtained from this work by those interested in their control. The arrangement is good and should be helpful in enabling the reader to select the part which he is desirous of studying. Especially interesting and valuable is the section devoted to the diseases classed as "roup": an excellent descriptive table illustrates the differential diagnosis. To be noted throughout the text are statements of observations of the author and others which have not already been published. An example is the note on p. 24 that there is more than one fowl pox virus strain in New South Wales. This is important and we look forward to reading, at an early date, "the critical confirmation" of the observation. Leucosis, leucosis-like diseases and fowl paralysis are grouped together and a general review is recorded of current views as to their cause and nature. The descriptions are good though no definite conclusions are given concerning the author's view on the relationship of the conditions as they occur in Australia. A useful section is that dealing with deficiency diseases. The book is well illustrated. It can be justly said that the keynote throughout the work is its practical nature and for that reason, among others, although it has been written mainly for the use of poultry keepers, members of the veterinary profession should find in it much to assist them in their search for the latest information on diseases of poultry.

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VACCINATION FOR CONTAGIOUS ABORTION

WHILST abortion can, where circumstances are suitable, be eradicated by segregation of infected animals detected by the agglutination test, there is a larger number of herds in which, because they are not self-contained or for other reasons such as lack of accommodation, it is impossible to use segregation methods. In these control must be dependent on the raising of the resistance of the individual and the herd by vaccination.

The ideal method would be by means of a dead product because it would be unlikely to cause abortion even in pregnant animals and could not be a means of spreading infection. Up to the present time, however, no effective dead vaccine has been produced, though work still continues on this problem and there are indications that success may possibly be achieved in the future. Living vaccines have, therefore, been used. There is, however, still much disagreement regarding the degree of protection afforded by them and some of the reasons for this are discussed by Dr. McEwen in an article published in this issue.

Most authorities will agree, however, that on the whole living vaccines made from virulent strains do afford considerable protection and reduce the number of actual abortions, though their value appears to vary widely on different farms and at different times. These living virulent vaccines have, however, the disadvantage that they are actually a means of infecting the animal and that in a considerable proportion of animals such infection persists and may give rise to excretion in the milk and other undesirable sequelae.* Search has, therefore, been made for many years now for strains of modified virulence, or for methods of vaccination which will give a sufficient degree of immunity without attendant undesirable effects. In considering these it is well always to bear in mind, firstly, that in general the more virulent strains have given the greater protection and, secondly, that the same vaccine is not the best for all herds or methods of use. For vaccination during calfhood—the value of which is now fairly well attested—a fully virulent strain can be used and indeed is desirable, for reasons stated above, and almost invariably the calves cease to react before they are adult. Virulent vaccines may also be temporarily desirable in heavily infected herds. For other herds there are several other vaccines which are suited by virtue of their properties for certain circumstances. These attenuated or modified strains have been produced

*Readers will be aware that the use of a live vaccine is not permitted in herds which are licensed to produce tuberculin-tested milk.

here and abroad. Thus there is available a non-virulent strain which can safely be used on pregant animals but of which several doses are required and which produce agglutinins which persist for a year or so. There is another which cannot safely be used on pregnant cattle but which confers a higher degree of immunity, and causes no agglutination reactions to the tests ordinarily used—a feature which would complicate eradication schemes.

It is not possible to discuss these strains or methods in detail here, but it is clear that the time is now ripe to consider whether they should be made available for practical use on a wide scale or whether large-scale field trials should first be pushed forward. In view of the importance of the disease to agriculture, and perhaps to public health, we hope that one or other of these alternatives be instituted without delay.

REPORT

[**CEYLON**: Department of Agriculture—Report of the Government Veterinary Surgeon (Crawford, M.) for 1938. Pp. 13. 8 tables. Govt. Printer.]

Contagious Diseases.—On the whole the country was free from serious outbreaks of infectious diseases. Foot-and-mouth disease occurred in all provinces but the number of cases reported decreased considerably. Now that rinderpest has been eliminated this disease is one of the greatest obstacles to dairy farming. Haemorrhagic septicaemia, although never very common, is definitely on the increase. Reports of losses from blackquarter are also becoming more frequent. No cases of bovine tuberculosis have been reported—it would appear to be absent in Ceylon. Positive cases of rabies decreased slightly in numbers. Pseudo fowl pest and sarcoptic mange cause considerable losses; in the treatment of the latter disease in goats a lime and sulphur dip is used with success. Bovine piroplasmosis is endemic; in imported cattle it is controlled with trypaflavine.

Veterinary Laboratory.—The work of this laboratory is hampered by lack of sufficient accommodation. A disease of goats in the Mannar District was investigated: its symptoms and *post-mortem* findings are described—it is said to resemble somewhat "heart water" of goats in South Africa. A case of amoebic dysentery in a dog was found to be caused by an organism morphologically indistinguishable from *Entamoeba histolytica* of man. Artificial insemination of the cow has been successfully performed using the "Cambridge" apparatus. Aegyptianellosis in poultry is described, as are several other poultry diseases.

The Government Dairy, Colombo.—This dairy is run by the Veterinary Division and supplies milk to the Government Hospitals.

Colombo Quarantine.—All imported cattle have to pass through this quarantine to prevent the introduction of rinderpest.

Veterinary Dispensaries.—One small dispensary is maintained at Jaffna.

R. F.

CLINICAL COMMUNICATIONS

Foreign Body in the Small Intestine of a Dog.

D. G. HANBURY, B.V.Sc., M.R.C.V.S.

Subject.—White bull-terrier dog, aged ten months.

History.—Progressive loss of condition during the previous fortnight, without apparent cause.

Symptoms.—On admission to the Liverpool University Veterinary Hospital on November 8th, 1939, the dog appeared rather dejected and the bodily condition was poor. Temperature, pulse and respirations were normal. Abdominal palpation revealed an almost cylindrical, doughy body in the lower part of the hypogastric area.

A definite diagnosis could not be arrived at, and at least three suggestions presented themselves, *viz.* tuberculous lymph-gland, neoplasm and foreign body in the intestine. The swelling was not in the position usually associated with faecal impaction.

A dose of castor oil, coupled with enemata, produced fluid evacuations, but the abnormality was still palpable. From November 10th to 17th, 1939, a normal diet was given and the dog was weighed daily. The initial weight was 34 lb., and, on November 17th, 30½ lb. During this time the appetite was good and faeces normal. Examination of the urine failed to reveal any abnormality. The foreign body could still be palpated.

It was decided to perform exploratory laparotomy, but circumstances caused this to be delayed until December 5th.

Laparo-enterotomy.—After the usual preparation, consisting of fasting and alimentary evacuation, general anaesthesia was induced by A.C.E. mixture preceded by morphine.

The site of abdominal incision was at the linea alba in the region of the umbilicus. The affected length of bowel was easily found and proved to be a portion of small intestine, considerably dilated, and apparently containing a fairly solid cylindrical body. After clamping the intestine the body was extracted through a longitudinal incision about 3 inches long, in the unattached side of the viscus. It was found to be a butcher's cloth, about 12 by 18 inches in size, rolled up after the manner of a rope, about 1½ inches in diameter.

The bowel wound was closed by a single layer of continuous Lembert suture of silk, and the abdominal wall was sutured in two layers—peritoneum and muscles in one layer using interrupted gut sutures, and the skin was drawn together with Halstead sutures of silk-worm gut.

Post-operative treatment consisted of the administration of large doses of glucose-saline subcutaneously for several days and then a glucose-milk diet. Recovery was uneventful, and, about a fortnight after operation, the dog was put on a normal diet. Although at this time the animal was extremely thin, his appetite was very good and he began to increase in weight. When last seen he appeared normal in every way.

The writer wishes to express his thanks to Mr. G. H. Arthur, B.V.Sc., M.R.C.V.S., of the Liverpool University Veterinary Hospital, who co-operated extensively in this case, and to Mr. R. Isherwood, M.R.C.V.S., Administrator of the Hospital, for permission to publish this report.

Dr. Provost's Embryotome in the Cow and Mare.

S. BURKE*

Case I.—*Subject.*—Cob mare, eight years old; second foaling.

History.—Parturition began at 12 noon. No progress being made, the owner inserted his hand and found all four feet and the head in the pelvic cavity. He made no attempt to rectify the condition and the mare was attended at 3.30 p.m.

While being examined she strained violently and threw herself down; she was then hobbled and chloroformed in the field.

Procedure.—The hind parts having been raised on two sacks stuffed with straw, attempts were made to push back the hind legs into the uterus; these efforts failed, however, as the hind feet persisted in entering the pelvis when any traction was applied to the fore limbs. It was then decided to amputate the hind limbs as high up as possible. The foetus was dead. One hind limb was drawn out to the maximum extent—until the fetlock reached the exterior. The loop of the wire cable was pushed along this limb as far up as it could be applied—about the middle of the tibia, where the limb was severed. The same procedure was adopted with the other hind leg. The stumps were grasped and pushed back as far as possible into the uterus. The fore limbs and head were then brought into the pelvis and moderate traction delivered the foetus, the stumps of the hind limbs coming out in the normal position.

The placenta was removed and four Entozon bougies were inserted into the uterus. The mare made an uninterrupted recovery. The time taken for dealing with this usually formidable presentation was not more than one hour, and little physical effort was required.

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Case II.—*Subject.*—Shorthorn cow, fifth calving.

This cow, for some years, suffered from a broken pelvis, which narrowed the pelvic cavity, but despite this impediment she had calved on two previous occasions with the help of the owner. On this occasion the presentation was posterior and normal. The owner tried severe traction but failed to deliver the foetus.

Examination revealed a very big foetus with the hips blocked at the pelvic inlet. Embryotomy was decided on and the loop of the cable was passed as far as possible on to the pelvis of the foetus. The intention was to divide the pelvis but the cable slipped and the section was made just below the hip joint, leaving the head of the femur in the acetabulum. Traction on the other hind limb delivered the foetus—an exceptionally large calf. The cow did well.

Remarks.—The two cases described presented features so formidable that it is considered that, without this instrument, it would probably have proved impossible to overcome the difficulties. Both cases were quickly dealt with and without any of the tiring effects on the operator usually associated with the older methods of embryotomy.

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ABSTRACTS

[**THE ALLERGIC REACTION IN THE CONTROL OF DISTOMATOSIS.** (Trans. title.) Aygun, S. T., and Baskaya, F. (1939.) *Tierärtzl. Rdsch.* **45.** 379-382.]

Liver fluke disease is widely distributed in Turkey, as in the rest of the world, in all domestic animals, but especially in sheep and goats, causing noteworthy damage. Farmers have, until now, treated it themselves, obtaining cures with Distol and Distophagin, but it is also known that the disease can be latent and chronic, lasting a long time before clinical symptoms become clear enough for diagnosis to be made. Early and certain diagnosis is important. Recently Turkey has introduced Government regulations for the control of the disease. Where the infestations are slight, the farmer can try to cure them with appropriate means; in areas where there is a medium grade infestation, the officially appointed veterinary surgeon decides which herds shall be treated by Government means; in areas where infestations are heavy, all animals of each year are treated by Government means by the officially appointed veterinary surgeon and cured, free of charge to the owner.

Statistics show that, even in this latter category only (heavily infested areas), the treatment of 8 million animals must be undertaken at the expense of the Government and, because the Government must also provide means for treating other animal diseases, the cost becomes prohibitive. Cost can be reduced by treating only animals known to have the disease, but this requires a quick, certain method of diagnosis, free from error, which will detect the infestation in its early stages, for in the later stages, when clinical symptoms are marked and internal organs are damaged, cure is hardly to be expected within the average lifetime of the animal and it is either useless or greatly reduced in value.

Diagnosis by finding the eggs in the faeces may be negative in infested animals because eggs may be too few to be found even by concentration methods and errors of technique may lead to failure. Further, this method is costly and laborious when large herds must be examined. The same applies to complement-fixation and precipitin tests and these are difficult for practising veterinarians to perform, especially in Turkey and many Eastern countries, where herds are still kept nomadic in the steppes without reliable markings of individual animals. Laboratory workers must remember these difficulties of the practising veterinarian and seek to help him. The authors' method of diagnosis by an allergic skin reaction, analogous to the tuberculin reaction, is designed to provide the field veterinarian with a reliable method of diagnosis which can be carried out on the pastures or steppes. The authors believe it can decide the diagnosis with great certainty.

To prepare the allergen collect specimens of *Fasciola hepatica* from the slaughterhouses, wash them free from mucus and bile in normal saline and then dry at not more than 40° C. in dishes and powder up. Of this powder 2 grammes are extracted with ether and then washed and dried again. Extracts made with carbon tetrachloride, acetone, chloroform and carbon bisulphide were also tried, but were inferior to the ether extracts. Divide the dried mass into two parts. One part is mixed with equal parts of glycerine and

1 in 10 sodium chloride solution; the other part is mixed first with distilled water, shaken well and then extracted with 1·7 per cent. sodium chloride solution and glycerine and filtered through cotton wool. When the extracts were made with glycerine and normal saline only, without using ether, acetone, etc., very strong and long-lasting allergic reactions were obtained, but there was so little difference between positive and negative reactions that many errors arose.

The reaction was obtained by injecting 0·25 c.c. of the allergen intracutaneously, the skin beneath the tail of sheep and goats and that of the side of the neck of horses and cattle being most suitable. Controls were done by injecting at the same site the same dose of normal saline and glycerine.

The positive reaction is a reddening and slight thickening of the skin at the site of injection, which begins five to 20 minutes after the injection and lasts for four to five hours, this persistence of the reaction being decisive. A slight reddening which disappears within 60 to 90 hours is negative. Pseudo-reactions occur, consisting of a wide reddening and oedematous swelling, the reddening disappearing within 45 minutes and the oedema some time later, the persistence of the oedema and early disappearance of the reddening being characteristic of this pseudo-reaction.

A table is given showing the results obtained in 100 cases. All these were controlled by faecal examinations for eggs of *Fasciola* and, when no eggs were found, *post-mortem* examinations were made. In general the allergy reactions correspond with the faecal examinations, but in two cases no eggs were found in the faeces of animals giving positive allergy reactions and in those the sections made after *post-mortem* showed that *Fasciola* were present.

The authors plan to study these reactions in animals treated with Distophagin and Distolysin.

G. L.

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[**PARTURIENT PARESIS IN EWES.** Cameron, H. S., and Goss, H. (1940.) *J. Amer. vet. med. Ass.* **96.** 165.]

In an endeavour to solve the problem of the etiology of preparturient paresis (pregnancy toxaemia) in ewes, the blood of 42 pregnant ewes subjected to various environmental and dietary conditions was analysed periodically during the gestation period. The ewes were divided into four groups which were treated as follows :—

1. Control group.—Fed liberally on free range.
2. Treated like group (1) for the first three months and then fed a high protein diet in a small enclosure.
3. Kept in a small enclosure during the whole gestation period but liberally fed.

Fed liberally on free range for four months and then moved to a small enclosure and given a high fat, low carbohydrate diet. No cases of parturient paresis developed. Eight blood samples were taken from each animal during the course of the experiment and analysed for glucose, ketone bodies and alkali reserve. The blood picture was much the same in all groups except for a slight lowering of alkali reserve in group (4).

Blood analyses in 14 cases of the disease showed on the average a slight hypoglycaemia with considerable ketonaemia and a lowered alkali reserve. Treatment with intravenous injections of glucose reduced the ketonaemia and prolonged the course of the disease but failed to cure the condition. Forced exercise seemed to have a definite preventive effect.

A. R.

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[**PRELIMINARY OBSERVATIONS ON THE EFFECTS OF A LOW CALCIUM DIET ON GOATS AND KIDS.** Glock, G. E., Murray, M. M., and Glover, R. E. (1939.) *J. comp. Path.* **52.** 229-248.]

A condition of calcium deficiency was accidentally produced in goats fed upon a diet of bran, oats and hay and later experimentally in kids. The symptoms shown were loss of weight and appetite, marked swelling of the jaws, lameness and paresis. Blood analysis showed a low serum calcium value and high inorganic phosphate and phosphatase values. The macro- and microscopic findings in the bones were not typical of rickets and the authors conclude that the condition produced was that of osteofibrosis.

The blood picture of one kid in which calcium deficiency had been produced returned to normal when vitamin D was added to the diet, yet the animal did not thrive and eventually died. Another kid which received a calcium supplement to the diet throughout the experiment developed normally; on *post-mortem* examination it was found to have a hypoplastic thyroid but was otherwise normal. The only animal which was entirely normal during the experiment was one which received both a calcium and vitamin D supplement. No *post-mortem* examination was made on this animal.

A. T. P.

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[**THE ENDOGENOUS NITROGEN METABOLISM OF SHEEP, WITH SPECIAL REFERENCE TO THE MAINTENANCE REQUIREMENT OF PROTEIN.** Smuts, D. B., and Marais, J. S. C. (1938.) *Onderstepoort J.* **11.** 131-139. (4 graphs. 2 tables. 15 refs.).]

Mature merino wethers were provided for a month with a diet consisting solely of lucerne, and were then transferred to metabolism cages and given a nitrogen-free ration consisting of: dextrinised starch 73, agar 20, cod liver oil 2, bone-ash 3 and salt 2. (In testing out various N-free diets, it was found that the addition of sugar, even in amounts corresponding only to 5 per cent. of the ration, set up scouring). In the case of three sheep which had received a lucerne diet containing 14 per cent. of protein, the low constant "endogenous level" of total-N excretion was reached in approximately 11, 14 and 16 days respectively, whereas in four sheep, whose lucerne diet had contained only 8 per cent. protein, the corresponding level was attained in approximately six days. Animals which were subjected to two periods of N-free feeding were found to have very constant levels of endogenous-N excretion.

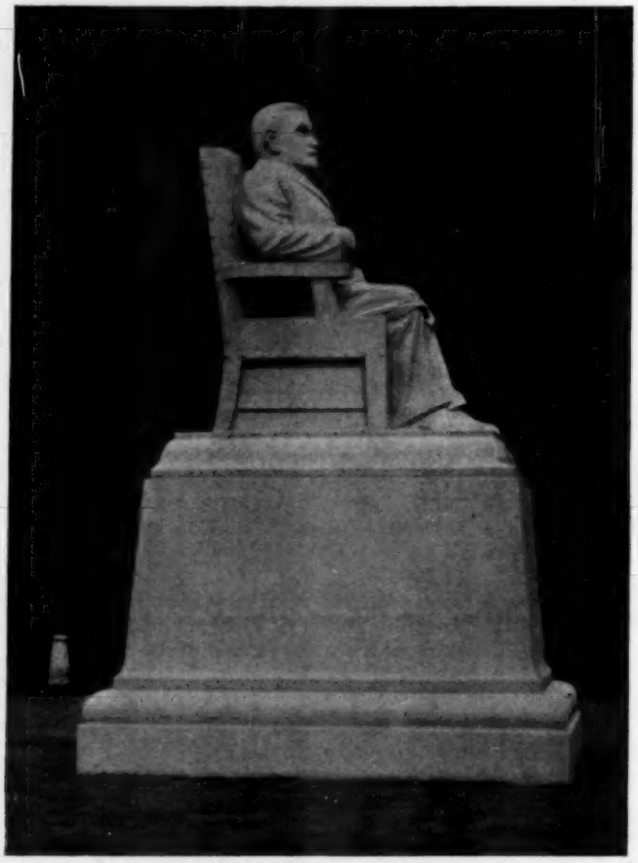
The average excretion of endogenous N in ten sheep was found to be 0·041 gramme per Kg. body-weight. From this it is calculated that the maintenance requirement of protein (*i.e.* 0·256 gramme per Kg. body-weight, representing approximately 23 grammes of digestible crude protein per 100 lb. live-weight in the case of a protein of biological value 50) is considerably lower than that advocated by certain authors for this species.

A. N. W.

SIR ARNOLD THEILER

In our issue of March 16th, we gave an account of the unveiling by the Prime Minister of the Union of South Africa of the statue that has been erected at the Onderstepoort Veterinary Research Institute South Africa, in memory of its founder, the late Sir Arnold Theiler.

We are now able to reproduce a photograph of the statue. It is a great source of satisfaction to his many colleagues and friends that the illustrious services Theiler rendered to veterinary science have received such world-wide recognition. The country of his adoption has added to its recognition of Theiler's achievements by the erection of this tribute to his memory.



Statue, by Mr. Coert Steynberg, erected before the main building at the Veterinary Research Institute, Onderstepoort, near Pretoria, unveiled by General the Rt. Hon. J. C. Smuts, Prime Minister of the Union of South Africa, on November 15th, 1939.

No more capable speaker could have been found to take the lead at the opening ceremony than the Union Prime Minister, the Rt. Hon. J. C. Smuts. Himself an authority on and devotee of agriculture, a man of letters, a philosopher and a scientist, as well as a politician and, last but not least, a South African, he has been able to appreciate the value of veterinary research to an agricultural community and particularly to his country, and he has always been ready to give emphasis to this opinion.

A statesman who remembers the ravages disease wrought in his country in the earlier years of its development and the benefits that have accrued from the activities of veterinary science in South Africa, would naturally appreciate the worth of such a man as Sir Arnold Theiler. Every layman knows from his novel reading—notably from "Rider Haggard"—the extent to which animal disease worried the pioneers of the last century. Rinderpest, contagious bovine pleuro-pneumonia, East Coast fever and horse sickness are closely linked with history in South Africa. The value of veterinary services in South Africa has been universally acknowledged and the evidence is to be found in many directions. The foundation and development of the Onderstepoort Laboratory with its really great scope is in itself a measure of the reliance South Africa places on the services of the veterinary profession. The wide recognition of scientific bodies all over the world of Sir Arnold Theiler's achievements and their bestowal on him of academic honours are a measure of the recognition by scientists outside the profession of its importance and of its share in the betterment of the lot of mankind as civilisation progresses and social and other services are able to play their rôle.

Even so, governments, the people and science as a whole have been painfully slow or failed dismally to appreciate the importance of the veterinarian in the community and the tale of this failure is told in the history of suffering which man and animals have to bear as a consequence.

Even to-day human beings have to run the risk of trichinosis and hydatid cysts in the United Kingdom. Rabies still takes its toll in Europe. Human beings have to run the risks of contracting a disease from horses that has only been known to exist for a few years—equine encephalomyelitis. Tuberculosis in children due to infection from cow's milk continues to be regarded in some circles as an act of God.

It is to be hoped that when our lives again become normal after this war, veterinary science may receive its full measure of recognition in every way: in the financial support it receives from the community, in the status of its members and in the opportunities it is given to contribute to happiness and prosperity in this world. Sir Arnold Theiler is a magnificent example of what may be expected of his profession.

BOMBAY VETERINARY COLLEGE

The *Times of India* states that, with a view to giving special prominence to the training of veterinary assistant surgeons in certain subjects, the Government of Bombay has decided to introduce a revised curriculum of studies at the Bombay Veterinary College. It will be started with the year beginning on June 15th. Inter Science (B. Group) will be the minimum qualification for admission, says the Director of Information, Bombay. The superior college staff has been strengthened and changes have been made in the college rules and regulations.

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3,000,000 DOGS TO DIE IN GERMANY

An order has been issued through the German Press that all dogs not on war service shall be killed. This will involve about 3,000,000 dogs, which are to be slaughtered because, according to an official explanation, they need food which might be used for human consumption.—*The Times.*

IN PARLIAMENT

Cheap Milk Scheme

In the House of Commons on Tuesday last, Mr. Boothby (Parliamentary Secretary, Ministry of Food) announced that the Minister of Food was arranging a cheap milk scheme and an exhaustive inquiry into the present system of milk distribution, with a view to a substantial reduction of cost. Pending the latter inquiry, Lord Woolton had decided that there was no alternative but to increase the retail price of milk by 4d. a gallon from July 1st, but he was not prepared to do so until he had made satisfactory arrangements to avoid hardship to those to whom milk was indispensable. It was hoped to bring into operation on July 1st, or soon after that date, a comprehensive national scheme to provide a daily pint of milk at the greatly reduced price of 2d. for expectant or nursing mothers and children under school age in every household desiring it. Milk would be supplied free to households which could not afford to buy it.

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The Colonial Development and Welfare Bill passed through Committee and was read the third time, on Tuesday last.

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Colonial Research Advisory Committee

Mr. Price asked the Under-Secretary of State for the Colonies when it is proposed to set up the Colonial Research Advisory Committee; how it is proposed to recruit its members; and what are to be its precise powers and functions?

Mr. George Hall: My Noble Friend is unable to say how soon circumstances will permit of the Committee being set up. As has already been announced, Lord Hailey has consented to serve as Chairman of the Committee. No other appointments to it have yet been made. The general functions of the Committee have been described in the Paper already laid before Parliament, and there is nothing that I could usefully add at this stage.

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Research Work

Mr. Stokes asked the Minister of Supply what steps he proposes to take in order to organise the research workers of the country and indicate to them in their various localities the kind of research which is most needed in order to help the national effort?

Mr. H. Morrison: Comprehensive steps have already ben taken to organise the national research effort. The chief research agencies are the research establishments controlled by the Supply and Service Departments and the research establishments and associations of the Department of Scientific and Industrial Research. All these activities are closely co-ordinated for the production of all the requisites for National Defence, and there is pooling of effort between them in a vast range of subjects. In addition, there are the medical and agricultural research activities, respectively, under the Medical Research Council and the Agricultural Research Council, which are also closely linked with the research work of the Supply and Service Departments. Finally, a large volume of systematic work is being carried on at universities and in industrial laboratories, of which the utmost possible advantage has been taken by those responsible for the organisation of research in the Departments concerned. The response given by all those concerned has been most gratifying in spirit and productive in result.

Animal Feeding Stuffs

Mr. De la Bere asked the Parliamentary Secretary to the Ministry of Food whether he is aware that the allocation of feeding stuffs to many corn and cake dealers throughout the country districts for the first 14 days of May was only 22 per cent. of the amount they received in the corresponding period last year; and whether he can give some assurance that this allocation will be improved at the earliest opportunity, and the inequalities of allocation adjusted?

Mr. Boothby: The allocation to the trade of 66 per cent. of their normal supplies of imported cereal feeding stuffs was, in the month of May, made in two instalments, namely, 32 per cent. in the first half of the month and 34 per cent. in the second half. So far as I am aware, there have been no inequalities of allocation, but if my hon. Friend will let me have particulars of any case he has in mind I will have inquiries made.

Mr. De la Bere: Would the hon. Gentleman endeavour to strengthen this machinery in order that a greater quantity of food stuffs may be available?

Mr. Boothby: Yes, Sir. We shall do all we can, but I shall have to have a word with my hon. Friend afterwards.

Mr. Glenvil Hall asked the Parliamentary Secretary to the Ministry of Food what regulations are in force limiting the provision of feeding stuffs for racing greyhounds?

Mr. Boothby: The provision of feeding stuffs for dogs, including racing greyhounds, is limited under the Milled Wheaten Substances (Restrictions) Order, 1940. The Order prohibits the use of milled wheaten substances for purposes other than human food, except under licence. Manufacturers of dog biscuits may, for the present, obtain licences to manufacture up to two-thirds of the quantities used in the corresponding period in 1939.

Mr. Hall: Is the hon. Gentleman aware that many of these racing greyhounds are fed upon brown bread, wholemeal, eggs, fresh meat, brandy and many other things, amounting to many hundreds of tons per year; and does he not think it is grossly unfair that food stuffs should be wasted in that way while poultry keepers, for example in my own division, cannot get supplies?

Mr. Boothby: The general question of the continuance of dog-racing does not, of course, come under my Department. It is a matter for the Government, but the hon. Member may rest assured that if it is found necessary further to restrict the use of such feeding stuffs we shall not hesitate to take action.

Mr. Hall: Is the hon. Gentleman not aware that this racing is going on and that further tracks are being opened?

Mr. Davidson: Will the restriction be general, and apply also to racehorses and hunting horses?

PAPER CHASE

The *Farmers' Weekly* tells the following (true) "tale of a pig": —

"A certain farmer had a pig and a hungry family. He decided to kill the former to feed the latter and was told to apply to the sanitary inspector (seven miles away) for the necessary permit. Inspector was away. Clerk promised to 'phone when the superior officer returned. "Meanwhile," quoth the clerk, "go to the police station. It may be that they can help you." So the farmer hied him to the police sergeant. "But you're not in our district," said he. "You'd better go to the constable in your own parish, sir."

"By now bewildered farmer called on village constable, who, having consulted this, that and t'other order, ponderously decided that farmer ought to apply to sanitary inspector. In the evening a telegram boy arrived, bringing a wire telling the farmer he should apply to the auctioneer in a neighbouring town. He did, and was told he must go to the Food Controller. Next morning, he found the Food Controller. There, at last, his quest was ended, and the permit to kill one swine was there and then handed over. Which just shows you. Anyway in this case he had travelled 54 m.p.p. (miles per pig)."

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

June 17th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 4 p.m.

June 20th.—Meeting of Executive of N.V.M.A., Survey Committee, 36, Gordon Square, W.C.1, 11.15 a.m.

June 27th.—R.C.V.S. Written Examinations begin.

July 1st.—N.V.M.A. Committees, Edinburgh.

July 2nd.—N.V.M.A. **Council** and Committees, Edinburgh.

July 3rd.—Provisional date for commencement of R.C.V.S. Oral and Practical Examinations.

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The New President of the Royal College of Veterinary Surgeons

The new President of the Royal College is Mr. John Holroyd, F.R.C.V.S., D.V.S.M. (VICT.), of Blackburn. Mr. Holroyd, to whose career fuller reference will be made later, became a member of the Council of the R.C.V.S. in 1927 and ever since he has attended the meetings with the greatest assiduity and seriousness of purpose. He has been Chairman of the Library and Publication Committee for the past eight years and has also served on the Examination and Finance Committees and on many special Committees. He has been particularly interested in the conduct of the examinations of the College, and has acted as Delegate of the Council at the examinations held at the University of Liverpool for many years. Few members of the Council have a better understanding than Mr. Holroyd of the duties which the Council is called upon to perform, and the high office which has been conferred upon him will be in safe hands.

In extending to the new President, on behalf of the profession, heartfelt good wishes in his inevitably arduous task of leadership in these supremely difficult days, we would take this opportunity of paying high tribute to the splendid work as President of his predecessor, Professor G. H. Wooldridge, whose immediate and able response to every additional demand made of him by reason of the war situation, is gratefully acknowledged not only by the Council but by every member of the profession at this time.

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VETERINARY COUNCIL, EIRE

At a meeting of the Veterinary Council held on June 5th, 1940, Mr. A. A. Donnelly as Returning Officer, reported that at the Council Elections held on May 24th, he had declared Professor J. J. O'Connor elected as General Elected Member for four years, and Professor W. Kearney as Limited Elected Member also for a period of four years.

The following Committees were appointed: Standing and Penal Cases Committee, Professor W. Kearney, Mr. P. F. Dolan and the President; Finance Committee, Professor W. Kearney, Mr. P. F. Dolan and the President.

The National A.R.P. for Animals Committee

The Rural Areas Scheme

Our readers will be glad to learn that the National A.R.P. for Animals Committee's Rural Areas Scheme is progressing well although, of course, it will be understood that it will be some little time before it reaches its full development. It cannot be over-emphasised, however, that one of the most important necessities for the success of the scheme is that adequate means of communication must be established. In many instances speed of action is essential to the success of the service. In the recent happenings on the East Coast delay has occurred in connection with this crucial point of means of communication, upon which the efficiency of the service must greatly depend, and in consequence the maximum salvage hoped for has not been achieved.

In the first list of those who have kindly agreed to act as Area Veterinary Controllers (published in our last issue), particulars of the area covered by Mr. W. Lyle Stewart (Newcastle-on-Tyne) should be amended to read Northumberland, Durham and Yorkshire.

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PERSONAL

Appointment.—Announcement is made of the following (promotion) appointment in the Colonial Veterinary Service: Mr. G. B. Simmins, M.R.C.V.S., D.V.S.M., Senior Veterinary Research Officer, Palestine, to be Chief Veterinary Officer.

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Forthcoming Marriage.—The engagement is announced between William Alfred Milligan, M.R.C.V.S., D.V.S.M., elder son of Mr. A. J. Milligan, M.R.C.V.S., and the late Mrs. Milligan, Annan, Dumfriesshire, and Miss Hannah Margaret Taylor, daughter of the late Mr. W. R. Taylor and Mrs. Taylor, Pimperne, Blandford, Dorset.

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On Leave.—Mr. A. Fulton, M.R.C.V.S., Senior Veterinary Officer, Gold Coast, has arrived in this country on leave.

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Will.—The late Mr. David Murdoch Reid, M.R.C.V.S., Dundee, left personal estate of £3,772.

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The Late Mr. W. Jackson Young

It is regretted that, in the account in our last issue of the funeral, at Aberdeen Crematorium on June 4th, of Mr. W. Jackson Young, F.R.C.V.S., D.V.S.M. (VICT.), reference was not made to the fact that Major D. S. Rabagliati, whose presence was recorded, represented not only the Ministry of Agriculture and Fisheries but the National Veterinary Medical Association.

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GENERAL STAFF FOR AGRICULTURE: MINISTER'S LIAISON OFFICERS

The Minister of Agriculture, Mr. R. S. Hudson, has appointed a number of liaison officers to act as his personal representatives for groups of counties in England and Wales. All executive powers remain in the hands of the county committees, which will continue to be directly responsible to Mr. Hudson. The new appointments are designed to secure closer contact between the committees and the Ministry on the general policy and direction of the food production campaign.

The function of the liaison officers is to keep the committees fully informed on matters of general policy, and to act as the Minister's "eyes and ears," thus ensuring that any difficulties or problems arising in their

districts will receive urgent attention at the G.H.Q. of the Ministry.

The following is a list of the liaison officers:—

Mr. W. Gavin, Agricultural Adviser, Ministry of Agriculture.—Chief Liaison Officer, and Kent, Middlesex, Surrey, Sussex (East and West).

Professor J. A. Hanley, Principal, King's College, Newcastle-upon-Tyne.—Northumberland, Cumberland, Durham, Westmorland, Yorks (East, North and West Ridings).

Captain E. Foster, chairman, Shropshire War Agricultural Executive Committee, Newton House, Bridgnorth, Salop.—Lancs, Cheshire, Shropshire, Staffordshire, Derby.

Mr. W. S. Mansfield, director, University Farm, Cambridge, 10, Grange Road, Cambridge.—Lincoln (Holland, Kesteven, and Lindsey), Notts, Cambridge, Isle of Ely, Hunts, Norfolk, Suffolk (East and West), Essex.

Professor F. L. Engledow, School of Agriculture, Cambridge.—Warwick, Leicester, Rutland, Northants, Soke of Peterborough, Bedford, Herts.

Mr. G. T. Hutchinson, treasurer, Christ Church, Oxford, Sarsden Glebe, Churchill, Oxon.—Bucks, Oxford, Berks, Gloucester, Hereford, Worcester.

Mr. Anthony Hurd, Ministry of Agriculture.—Wilts, Hants, Isle of Wight, Dorset, Somerset.

Mr. Cedric Drewe, M.P., Parliamentary Private Secretary, Ministry of Agriculture.—Devon, Cornwall.

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STORING FEEDING STUFFS

In connection with the decision to attempt to build up stocks of imported animal foodstuffs during the summer against the requirements of the winter, a correspondent to the *Farmer and Stockbreeder* states that it is proposed that oilcakes (both imported and home produced) and imported barley and maize should be stored in the warehouses of the oilseed crushers, compound manufacturers, provender millers, and, if possible, in the warehouses used by the larger country merchants.

"It has also been suggested that many farmers would be glad to purchase and store towards the end of the summer feeding stuffs required during the winter feeding period, and that during August and September extra allocations might be made to those farmers who may agree to undertake to set aside the extra quantities for subsequent use. Such extra quantities would, of course, be deducted when winter supplies were allocated. A dispersal of supplies would have obvious advantages. Steps are now to be taken to find how many farmers would take advantage of the arrangement."

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SCIENTIFIC FOOD COMMITTEE

The Lord Privy Seal, as Chairman of the Food Policy Committee of the War Cabinet of which the Ministers responsible for the Agricultural Departments and the Minister of Food are members, has appointed a Committee with the following terms of reference: "To consider and advise upon problems of national food requirements and of home food production with special regard to the shipping and foreign exchange likely to be available for imports of food and animal feeding stuffs, and the labour and other resources likely to be available for home production."

The Committee has been constituted as follows: Chairman, Sir William Bragg, O.M., K.C.B., F.R.S., President of the Royal Society; Deputy Chairman, Sir Alan Anderson, G.B.E.; Members, Professor A. W. Ashby, Professor of Agricultural Economics, University College of Wales, Aberystwyth; Professor E. P. Cathcart, C.B.E., F.R.S., Regius Professor of Physiology at Glasgow University, and a member of the Agricultural Research Council; Mr. Henry Clay; Professor F. L. Engledow, C.M.G., F.R.S., Professor of Agriculture at Cambridge; Mr. W. Gavin, C.B.E., Agricultural Adviser to the Ministry of Agriculture and Fisheries; Sir Edward Mellanby, M.D., F.R.S., Secretary of the Medical Research Council; Sir John Boyd Orr, F.R.S., Director of the Rowett Research Institute, Aberdeen; Professor J. A. Scott-Watson, Professor of Rural Economy at Oxford. Secretary, Professor D. S. M. Watson, F.R.S., Member of the Agricultural Research Council.

THE NEED FOR A MORE NUTRITIOUS BREAD

In an address to members of the Conservative Health and Housing Committee at the House of Commons, Professor J. C. Drummond, scientific adviser to the Ministry of Food, dealt with war-time food problems, especially in relation to nutrition.

He said that the outbreak of this war found a much better nourished population here than in 1914, owing to the greatly increased consumption of protective foods. There might, however, be a vitamin deficiency in the lower income groups unless a more nutritious bread came into consumption. A vigorous educational campaign would quickly popularise the wholemeal loaf, especially if it could be supplied at the same price as white bread. The roller mills of this country could produce a flour of 80 to 85 per cent. extraction for a thoroughly nutritious loaf without difficulty.

Professor Drummond referred to the great advantage achieved by the vitaminisation of margarine, which was now equal in value to a reasonably sound butter. He urged increased consumption of milk, cheese and potatoes, with abundant vegetables, as a sure protection against vitamin deficiency.

The Germans had made every provision to avoid the malnutrition which contributed to their defeat in 1918. They were relying on a sound peasant dietary—wholemeal bread, vegetables, potatoes and cheese. Their weak spot was a possible shortage of milk. They were also issuing, for the use both of troops and civilians, concentrated tablets of synthetic vitamins in every respect equal to the natural product. Such tablets were also being manufactured in this country and the output could be increased at any time to any extent.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Still Time to Ensure a Reserve of Feeding Stuffs.—The acute stage reached in the war makes it more necessary than ever to use soil resources fully. There is still time to sow marrow stem kale, rape, swedes and turnips. Livestock farmers in particular should grow all the feeding stuffs they possibly can, even if a full crop cannot be expected. The more self-supporting farms can be made, the better will present and future food difficulties be prevented.

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Chaffed Silage.—For those using structural silos, chaffed silage has these advantages:—

(*a*) Most crops grown on arable land pack better into the silo when chaffed, thereby reducing wastage from the air getting in. Some 30 to 40 per cent. more can be packed into the same volume when chaffed, thus reducing the overhead cost of the silo.

(*b*) There is less drainage from chaffed silage, which means more nutrients remain in the silo.

(*c*) Chaffed silage is easier to handle at feeding time.

Crops ensiled in clamps and stacks, when adequate consolidation can be given need not be chaffed.

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LEGAL NOTES

Heavy Slaughtering Penalties.—William Louis Steeples was summoned at Nottingham for allowing a stable to be used as a slaughterhouse without a licence, and William Allsop was summoned for slaughtering without being in possession of a licence. Arising out of the same set of circumstances, the Ministry of Food brought a further summons against Allsop for slaughtering a cow without the Minister's permission. Steeples was fined £40 and Allsop £18, in default two months' imprisonment.

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At Canterbury, Charles Fisher and Henry Sheead pleaded guilty to causing a pig to be slaughtered contrary

to the regulations, where the latter's slaughterer, William E. Pickering, pleaded guilty to killing the animal. For the defence it was pleaded that the offence was unintentional. Sheead was fined £10, Fisher £5, and Pickering 10s.

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SWINE FEVER

At a meeting of the Gloucestershire Agricultural Committee Sir Gilbert McIlquham reported that in reply to questions raised by the committee, the Ministry of Agriculture stated that research work on swine fever was being concentrated on the means by which an earlier accurate diagnosis of the disease might be obtained and a safe and reliable method of immunisation might be discovered. Research work was also in progress on allied pig diseases which might for a time mask the presence of swine fever and thereby delay diagnosis. It was reported that there was a decrease in swine fever both in Gloucestershire and in the country generally.

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"The swine fever epidemic in Aberdeenshire is still serious, but it is being mastered by the veterinary authorities," states the *Meat Trades Journal*. "No sales of young, store or breeding pigs are being held in the infected area which covers almost the whole of the county," and the Edinburgh correspondent of that journal observes, "Swine fever is still rampant and large numbers are being killed and sent to distant centres and are then found to be in bad condition. Fired beef and fired pork (off heavy pigs) is very common. Some say there is no redress for fired meat, and some say there is. The latest news on that vexed subject is that if a butcher receives his meat into his shop and notifies the wholesaler on the day he receives it he is entitled to send it back, but if he keeps it a night in his shop then he has no redress."

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STOCK MOVED FROM DANGER AREAS

It is announced that, as a precautionary measure, the numbers of livestock in certain limited areas in South-East England are being reduced. Stock offered that is fit for immediate slaughter is being purchased by the Ministry of Food, which in these areas only has waived the normal requirement of twelve days' notice for this purpose. A proportion of store animals, particularly ewes and lambs, is being transferred to other counties. The dispersal is in no way extensive and will have no effect upon the local supplies of home-killed meat. With this exception the marketing of both fat and store stock is proceeding in the normal way through collecting centres and markets.

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TUBERCULOUS CATTLE

An anomalous position with regard to the Attested Herd Scheme was discussed at a meeting of the Devon Diseases of Animals Sub-committee, at Exeter, when it was pointed out that cattle known to be tuberculous could be sold in markets.

Mr. F. W. Verney could not see how the scheme was going to eradicate, or even to suppress, the disease. If cattle were reactors and were sold—as they were allowed to be—in the open market, different owners could buy them and take the disease into their farms.

Mr. Verney said that since the Order came into operation, cattle from other counties had found their way into Devonshire to an extent they had never done before. Reactors should be declared as such when they were offered for sale.

The North Devon correspondent of the *Meat Trades Journal*, writing in reference to the above discussion, says, "The question of tuberculosis in cattle is one that affects members of the trade vitally, but the matter receives too little attention from public authorities. The tendency seems to be to shelve it. This is extraordinary in a nation that prides itself on its social and health services, and in a country in which the value of hygiene and cleanliness is constantly being impressed upon the community. In this connection one almost feels like quoting, with emphasis, the famous slogan used to advertise a proprietary medicine, 'Inside cleanliness comes first.' But the attention of the public was last week focused on this question, and rightly so, by a discussion that took place at a meeting of the Devon Diseases of Animals Sub-Committee. Here an anomalous position existing with regard to the Herd Inspection Scheme was stressed and strongly criticised, the alarming statement being made that cattle known to be suffering from the disease are offered for sale in the open market. The presence of the disease is readily apparent after slaughter, and the butcher is protected from loss who is covered in a trade insurance scheme. What happens in the case of those who are not is not quite clear.

"But surely, in the interests of national health, such a ridiculous situation should be immediately remedied. Whatever is the use of testing animals and diagnosing tuberculosis if the diseased animals are to be passed on to unsuspecting purchasers to spread the disease in other herds? The County Veterinary Officer, replying to questions at this meeting, admitted that the scheme had had little effect in reducing cases."

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RECENT AMERICAN WORK ON PLANT VIRUSES

The meeting of the American Association for the Advancement of Science, which was held at Columbus, Ohio, in December, was the occasion for the presentation of several interesting papers which make fundamental contributions to our knowledge of plant virus diseases. The proceedings are summarised in *Nature*, as follows: "The first categorical indication of structure of the virus particle can be obtained from a comparison of the work of John W. Gowen, of Iowa State College, with earlier findings. His work on X-ray inactivation and size of various organisms, including insects, bacteria and viruses, shows that functional correlation of these two factors 'must be between the size of some vital substances within the cell rather than the cell as a whole.' The 'reproductive' part of a virus particle has a molecular weight of 15,000,000, which compares with about 7,000,000 suggested by other workers for the whole virus particle. The portion of a virus susceptible to inactivation by X-rays is apparently denser than the rest of the particle.

"Vernon L. Frampton, of Cornell University, showed that the protein of tobacco mosaic virus is thixotropic; it forms a colloidal sol, but can change to the fluid state if it is agitated. The report consisted of motion pictures which recorded the birefringence of the sol as observed through polaroid plates. Thixotropic gels show neither Brownian movement, diffusion nor osmotic phenomena, and it is pointed out that any attempt to determine molecular weight of the protein by any of these means would yield abnormally large values.

"In the sphere of host-virus relations, Ernest L. Spencer, of the Rockefeller Institute for Medical Research, demonstrated that the rate of virus multiplication is closely bound with the nitrogen metabolism of the host. Tobacco plants growing in pure culture, and supplied with a relatively large amount of nitrogen, allowed the virus to attain about five times the concentration found in normally fed plants. The effect was not due to an increased growth-rate of the plant, and it was also demonstrated with older seedlings. James M. Wallace, of Riverside, California, dealt with the development of resistance to the curly top virus of Turkish tobacco. He showed that plants recover from an attack by the virus, a certain time after inoculation. Such plants, when re-inoculated, do not again develop severe symptoms. Transmission from a recovered to a healthy plant by means of insect vectors induced severe symptoms in the healthy plants, but grafting merely transferred the mild symptoms typical of the recovered plants. Resistance, therefore, appears to be due to some interaction which is set up between host and virus."

MILK MARKETING SCHEME

At the annual meeting of registered producers in England and Wales, Mr. Thomas Baxter, Chairman of the Milk Marketing Board, said that 1939 was a record year in every way. There were more individual producers, the volume of milk was greater, and the money realised from the sale of milk and paid to the producers was much larger. The quality of milk of tuberculin tested standard was also greatly increased and the amount paid for quality milks exceeded by £635,437 the sum paid in the previous year. Producer-retailers' sales continued to expand. The difficulties in which producers had been placed since the beginning of the war, particularly in their efforts to maintain the seasonal level of production, had been caused principally by the scarcity and increased prices of imported feeding stuffs and by the loss of some of the best labour on the farms.

The expenses of administering the scheme were smaller than in the previous year by £16,000, in spite of the increased work involved in the expansion of the scheme and carrying out the provisions of the new Milk Industry Act. The additional quality premiums payable under this Act had had an encouraging effect on the production of graded milks. Forty-five per cent. of the total milk produced in England and Wales last year reached graded standards, and earned quality premiums. With regard to the provision of cheap milk to nursing and expectant mothers there had not yet been much progress, but there was likely to be considerable development when the provisions of the scheme had been accepted by all parties concerned and local authorities took the necessary steps to put the scheme in force in their districts.

Referring to the discussions which have taken place with the Ministry of Food in connection with the formulation of a war-time milk policy, Mr. Baxter said the Government's first concern was the maintenance of the milk supplies at pre-war level. They recognised that the only practical policy was to ensure satisfactory supplies of feeding stuffs to the producers, and prices of milk which would cover adequately their increased costs and efforts.

* * * * *

THE FUTURE OF CLINICAL TEACHING

In an issue of the *Lancet* of recent date an article appeared on "The Future of Clinical Teaching" contributed by Professor Ryle, M.D.(LOND.), F.R.C.P., Regius Professor of Physic in the University of Cambridge and Consulting Physician to Guy's Hospital. Much of the subject matter of this article is applicable only to human medicine, but there are points that might be usefully considered in relation to the training of veterinary surgeons, for with Veterinary, as with Medical, Schools many radical changes are bound to follow the present upheaval in international affairs.

Professor Ryle deplores a decline in the standard of clinical teaching due to existing social conditions and the rapid advance in scientific knowledge. In general the clinical teacher must earn a livelihood by private practice and put its demands before those of his class. It has been argued that specialisation benefits the patient, but the teacher-consultant has little personal contact with his students, and it is a real problem how to give them better general training in clinical method, more logical approach to common problems, sounder appreciation of the value of history and symptoms, and a better correlation of bedside medicine with physiology.

Professor Ryle agrees that the teacher-consultant has much to give his classes that the whole-time teacher often fails to give, since professors are selected from men without experience of practice, but the teacher-consultant is apt to deteriorate as such with the increase of his private work.

Post-war reforms must concern themselves with:—

1. Schools and their support.
2. Teachers and the terms of their appointment.
3. Students and their selection.

In schools more of the time of teachers and students should be spent in the wards, out-patients' clinics, laboratories and *post-mortem* room, and there should be longer and freer discussion of cases. The physician should be more often in the operating theatre and the surgeon more often in the ward.

Increased Government grants for Universities and schools should follow the war, thus the solvency of teaching-hospitals would be ensured and with it better treatment for the sick, more progressive training of doctors and nurses, and the advancement of medical research.

The salaried Emergency Medical Staff set up for the war might provide a basis for post-war changes, each member of the teaching staff devoting a specified time each week to hospital teaching and research in return for a salary. In addition to the Government grant, an honorarium for tutorial work might be contributed from school or university funds.

In addition to this, teacher-consultants might be provided with consulting rooms at a moderate rental, within the hospital, thus insuring that the great part of their time should be spent there.

In addition to part-time appointments there should be whole-time directors of medical, surgical and obstetrical services in every hospital. These directors should be salaried by Government with additional emoluments from university and school funds.

The appointment of young research professors should not be discontinued, but their appointment should be in the hands of the Medical Research Council, while the appointment of the staff should be controlled by the school and university.

The Profession of Medicine should be recruited on a vocational basis; it should be the aim of the universities and schools to train fewer and better doctors. Professor Ryle emphasises the need in our Medical Schools of smaller and more devoted staffs, and fewer and more carefully selected students. He looks forward after the war to a reorganisation entailing more useful thought for the common weal, less jealousy and criticism of colleagues, and a restoration of languishing ethical codes.

* * * * *

IMPORTANCE OF THE SERUM ALBUMIN

"In experiments on the metabolism of albumin described in his Harvey lecture by Prof. A. Ashley Weech,* the serum albumin in dogs fed on a low protein diet was found to decline rapidly at first but slower as time went on," writes the *Lancet* in a recent annotation. "If the dog was then returned to a normal diet regeneration took place at a constant rate till the initial level was reached. But if the dog was kept on a low diet for many months the rate of albumin regeneration soon slowed down and it took a very long time to reach the original level. A similar state of affairs is found in man in nutritional oedema and nephrosis. This is explained by supposing that the organ involved in the regenerative process—namely, the liver—is damaged in these conditions. Experiments have revealed that albumin is slightly more permeable through the capillary wall than globulin. It has been known for some time that, far from there being a hydraemic plethora in nephrosis, the plasma volume is actually reduced. In animals there has now been shown to be a parallelism between a fall in plasma protein and a fall in blood volume. In dogs kept on a low protein diet there is a fall in cell volume and plasma volume, but after 20 to 30 days the plasma volume becomes stable while the red-cell volume continues to fall. The failure of the plasma volume to go on falling is explained by assuming that an opposing force is liberated by the diminishing red-cell volume to prevent an excessively low blood volume.

"In treating nutritional oedema in dogs Weech produced diuresis by injecting intravenously a concentrated solution of dog serum. The immediate effect of this on the blood was a great increase in the plasma volume

*WEECH, A. A., Harvey Lectures (New York), 1938-39. London: Baillière, Tindall and Cox. 1939. Pp. 57.

and a slight decrease in the serum-protein concentration due to dilution of the serum globulin. Transfusion with washed red cells also produced a diuresis, without, of course, contributing to the serum-protein concentration. Diuresis thus produced is therefore probably due to improved circulation consequent on increased blood volume. Various diets were tested to determine their efficiency in regenerating serum protein in dogs. Beef serum was found to be best, followed by egg-white, beef muscle, beef liver and casein. These experiments clearly have a considerable bearing on similar clinical conditions in man."

CORRESPONDENCE

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

* * * * *

THE "RESERVATION" OF THE PROFESSION

To the Editor of the Veterinary Record.

Sir,—I do not see much reason for all this "flutter in the dovecotes" about what is described as the "reservation" of the profession. It seems possible, if not probable, that we shall all be in the firing line before long and that there will be plenty of opportunity for the display of individual courage by old, middle-aged and young in the future. At present it seems to be our duty as a profession not "to reason why" but to fit in as best we are able, and bring credit to the niche in which it has pleased the fighters to place us.

I am glad to see that those returned at the recent R.C.V.S. Council election are composed largely of "the boys of the old brigade." It will take us all our time to match the courage of the lads at the front, but on the home front we must keep our chins up, and may God help us all.

Yours sincerely,
Gladstone Mayall.

Bolton.
June 8th, 1940.

. . . . .

To the Editor of the Veterinary Record.

Sir,—With reference to letters printed in the *Veterinary Record*, on May 11th and June 1st, 1940, signed F. Beckett, F.R.C.V.S., one is astonished to find a man with the status of "Fellow" in our future profession, with so little foresight. One would very much like to put Mr. Beckett into the very difficult situation in which we find ourselves to-day. All here are agreed that if the Government is short of man power they will certainly not hesitate to take us, and we would willingly do what is required of us. But meanwhile, during this time of utmost crisis, one should get on with one's job and be as little hindrance as possible to the Government's plans.

One would like to add that students here have foregone most of their leisure hours in order to give their services to the Local Defence Volunteer Corps.

Soon after hostilities commenced, we were authoritatively informed that the way in which we could serve our country best, was to qualify as quickly as possible.

Surely our course is plain enough!

Signed, on behalf of the Students' Union Societies Committee of Streatley House, Streatley, and Holme Park, Sonning,

Yours faithfully,
T. Threlkeld, *Hon. Secretary.*

Streatley House,
Streatley.
June 7th, 1940.

. . . . .

To the Editor of the Veterinary Record

Sir,—The letter written by Mr. Catmur, for all its sincerity, is far from being true. If letters received by me from members of the profession are to be believed, not only is unemployment common, but a great many more are going through very lean times owing to loss of business. Hunter work is practically non-existent as those who had large hunter practices well know to their sorrow, and the number of small animals destroyed in the cities runs into enormous figures.

I would point out to Mr. Howat that the only way to have the reservation removed is for the matter to be put up to the authorities by the R.C.V.S. and the N.V.M.A. Applications by private individuals carry no weight, however important they may consider themselves. I would inform Mr. Howat that quite a number of resolute members of our profession are serving with the B.E.F.

Yours faithfully,
F. Beckett.

Berkeley Lodge,
Blandford,
Dorset.
June 11th, 1940.

* * * * *

R.C.V.S. COUNCIL ELECTION

To the Editor of the Veterinary Record

Sir,—I wish to take this early opportunity of expressing, through the medium of your journal, my thanks to all those friends and supporters responsible for my re-election to Council, R.C.V.S.

Yours faithfully,
J. W. Procter.

3, The Crescent,
York.
June 9th, 1940.

. . . . .

To the Editor of the Veterinary Record

Sir,—Would you be good enough to allow me to express, through the medium of your correspondence column, my thanks to those electors who recorded votes in my favour in the recent election. I can assure them, and the profession as a whole, that I will do my utmost to serve their interests.

Yours faithfully,
Thos. M. Mitchell.

Inverthorne,
Thornholme Road,
Sunderland.
June 9th, 1940.

. . . . .

To the Editor of the Veterinary Record

Sir,—May I at the earliest opportunity express my grateful thanks to those Fellows and Members of the Royal College of Veterinary Surgeons who once again have returned me to office.

I hope that at the end of my term of office, I can once again rely upon their support. I am not a candidate from any particular Division, but am a member of many, and I can assure one and all that my earnest endeavour as in the past will be not only to safeguard the vital interests of all branches. but to subordinate any personal opinion to that which my electors would prefer.

I was told that my election address was short. I do not believe in promising the electors a millennium after the manner of a political candidate, for I know full well that such promises cannot materialise unless others in a majority agree. But what I do say is this: I seek no personal aggrandisement, but I do seek and shall do my best to secure, the integrity and the status of all my colleagues (I do not regard any member as a competitor) no matter in what branch of the profession they may be serving.

Yours faithfully,
J. F. D. Tutt.

"Rothiemurchus,"
St. Cross,
Winchester.

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